Ferric Staining in Waterfowl.—A not infrequent discoloration of portions of the normally white plumage in water-birds is the rusty-red staining imparted by iron compounds in some natural waters. In an article on the Little Pied Cormorant in the *Proceedings of the Royal Zoological Society of New South Wales* for the year 1947-48 (1949, p. 34), Messrs. J. A. Keast and A. F. D'Ombrain describe chemical tests on such stained feathers by Dr. A. Bolliger and Mr. A. L. Ritchie, of the Chemistry Department, Sydney University, as follows:

> " . . . strong hydrochloric acid quickly removed the colouring matter; cold 5 N acid completely cleaned the feathers and the solution became a rich yellow in a few seconds. The solution gave pronounced positive reactions for iron to the ammonium thiocyanate and potassium ferrocyanide tests: ethyl acetate removed the red coloration to the acetate layer in the case of the former test. Further, it was found possible to precipitate red ferric hydroxide by neutralising the solution with equivalent strength sodium hydroxide. The chloroform test for organic ferric compounds was negative. The black back feathers (which do not readily show staining) likewise gave a pronounced positive reaction for iron."
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> Keast and D'Ombrain continue: "It is worthy of note firstly that in all cases where staining was present amongst the Museum birds the coloration was restricted to the distal quarter of the feathers. . . . Until a certain concentration is reached, the coloration does not show in the field. In the Cattai Creek area, Hawkesbury River, where such birds are not infrequently seen, the legs of white horses which wade in the swamps frequently become stained reddish. Under comparatively still water conditions soluble ferrous humates and similar compounds, leached from the soil and rocks, are oxidised to the insoluble ferric oxide. The latter occurs as an 'oily' scum on the top of ponds and slow-moving streams which is seen to break up when the surface is disturbed. Concentration increases with evaporation and or reduction in speed of flow. Probably deposition on birds occurs when the outer parts of the feathers become wet following prolonged periods in the water."

In the *Handbook of the Birds of Western Australia*, Major Whittell and I give two local species as exhibiting occasionally this ferric discoloration, the Little Pied Cormorant *(Phalacrocorax melanoleucus)* and the Darter *(Anhinga rufa)*. There is one specimen of the latter species in the Western Australian Museum which is entirely rufous-red below instead of white, with a rufous tone on the upper-parts.

Recently I examined specimens of the Black Duck *(Anas poecilorhyncha)* which had a rusty discoloration on the normally white parts of the plumage. These were two birds which were shot on January 21, 1950 at Lake Mealup (or the Triangle Swamp), east of the Harvey Estuary. The two light stripes on the head were a light rust-red colour, but this was present only on the tips of the feathers: their concealed bases retained the original white colour. Doubtless other swamp birds with white feathers in the plumage will be found to exhibit signs of this ferric staining, which may vary in different natural waters. Reports of the occurrences would be of interest.

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